

APPENDIX B: Problems From Nonpoint Source Pollution

Sixty percent of the rivers assessed in the Commonwealth fail to meet federally mandated water quality standards. Eighty-nine percent of these streams fail to meet standards because of polluted runoff or nonpoint source pollution. Because the Shoreline Survey is an excellent tool to identify nonpoint source pollution, encourage those working on Shoreline Surveys to read this appendix.

Nonpoint Source Pollution and River Systems.

Sediments result from runoff from many sources including construction, farms, highway maintenance, gravel operations, logging, stream channelization, roads, storm drains and stream banks. In addition to problems caused by volume of sediment, the sediment load includes toxics and heavy metals which bond to sediments and accumulate on river beds.

Over a specific amount of time, sediments from areas where construction has drastically altered or destroyed the vegetative cover and soil mantle can exceed 20,000 to 40,000 times the sediments from adjacent undeveloped woodland. (Middlesex Conservation District. October 7, 1988.)

Sediments threaten fisheries, fill river channels and wetlands, increase flooding, reduce light and clarity, harm drinking water and damage the natural ecology of the river. Sedimentation is one of the major causes of the decline of fisheries in the nation. Sedimentation destroys habitat, including feeding and spawning areas, and can damage the respiration processes of fish.

Nutrients (especially nitrogen and phosphorous) enter rivers and streams from lawns, golf courses, farms, storm water, animal wastes, urban development and failing septic systems. Excess nutrients cause eutrophication (excessive algal and plant blooms) which clog rivers and streams, and when these plants die, deplete dissolved oxygen in the water important for fish and other forms of aquatic life. In addition, eutrophication may cause taste problems for those who depend on the river for water supply, and odor problems for those who live near or use the river.

Heavy metals (lead, copper, cadmium, zinc, mercury, aluminum and chromium) come from urban runoff, illegal dumping, or poor storage practices. They enter rivers either through storm drain runoff or bonded to sediments in runoff from the land. Heavy metals, such as mercury, have been stored on currently active or abandoned industrial sites. For example, mercury contamination from an old dye plant on the Sudbury River took years to find its way through ground water to wetlands, rivers and streams. Bottom feeding organisms consume the heavy metals with other food, and the heavy metals proceed through the food chain to affect other animals.

Toxics and hazardous materials come from landfills, junkyards, underground storage tanks, inappropriate industrial practices, hazardous waste disposal, septic systems, pesticide applications, poor storage practices, auto maintenance, runoff from highways and parking lots, and marinas. These substances accumulate in sediments or in the water column. Toxics and hazardous wastes accumulate in the food chain.

Nonpoint Source Pollution and River systems (continued)

Pesticides and herbicides from agriculture, lawn care, golf courses, and urban runoff accumulate in sediments. These poisons can kill aquatic organisms, harm water supplies, and increase the risk of public health. Many of these substances are carcinogens.

In 1962, in her book Since Silent Spring, Rachel Carson warned not only about fish kills from pesticides and herbicides, but also of the dangers of mixing many different chemicals together in our rivers and streams. These chemicals form combinations that can be more lethal than the original applications.

Bacteria and viruses from failing septic systems, from farm feed lots and manure piles, from animal wastes, and from storm water runoff degrade water quality and threaten life systems. Recent studies in coarse soils such as found on Cape Cod have shown that some viruses can travel much further than previously thought. Studies have shown viruses 2 feet--2723 feet from the septic system where they originated. Additional studies are needed to address these problems.

Salt comes from highway department storage, snow removal practices including road maintenance and disposal of salt-laden snow. Accumulations of salt in small streams can harm human health if used as a drinking water source and can harm aquatic organisms and the ecology of the stream. Once salt gets in ground water, sources of drinking water can be destroyed.

Thermal pollution usually refers to an increase in the stream temperature. In addition to water temperature increases from wastewater treatment plant discharges, thermal pollution can also occur because of construction, mining and gravel operations, urban runoff and hydrological changes. For example, the large expanses of parking lots and roofs from a shopping center can heat rain water; the first flush of this heated water can change the temperature of a stream.

Thermal pollution harms fisheries and sometimes causes a transition from cold water to warm water fisheries. It also can reduce the amount of dissolved oxygen in the stream, cause odors, increase the conditions for pathogens and bacteria growth, and encourage nuisance vegetation.

(For more information about Nonpoint Source Pollution and Best Management Practices can be found in DEP's Mega-Manual (Massachusetts Nonpoint Source Management Manual: A Guidance Document for Massachusetts Officials) which was distributed to all cities and towns in August, 1993.) Contact your Conservation Commission to review this document.

For more information about stream protection, see the Adopt-A-Stream Workbook: How to Protect Your River, Stream or Brook, which gives step by step suggestions for community groups to use in protecting local resources.